

San Diego Integrated Regional Water Management Implementation Grant Proposal Monitoring, Assessment, and Performance Measures

Attachment 6 consists of the following items:

- ✓ **Performance Measures.** The purpose of this attachment is to describe the monitoring, assessment, and performance measures that will be used to evaluate each proposed project. These measures will ensure that this proposal meets its intended goals, achieves measurable outcomes, and provides value to the Region and the State of California.

For each project in this *San Diego IRWM Implementation Grant Proposal*, specific performance measures and monitoring approaches have been developed to assess project performance on an ongoing basis. The purpose of this attachment is to provide a discussion of the monitoring system to be used to verify project performance with respect to the project benefits or objectives identified. For each proposed project, listed below, this attachment will identify data collection and analysis to be used.

This attachment will also discuss how monitoring data will be used to measure the performance in meeting the overall goals and objectives of the San Diego IRWM Plan. Each project applicant has prepared a Project Performance Measures Table (included in this attachment) that includes the following:

- Project goals
- Desired outcomes
- Output indicators – measures to effectively track output
- Outcome indicators – measures to evaluate change that is a direct result of the work
- Measurement tools and methods
- Targets – measureable targets that are feasible to meet during the life of the project

Project 1: Sustainable Landscapes Program

The *Sustainable Landscapes Program* is a multifaceted project that consists of a suite of activities designed to increase water efficiency and reduce watershed pollutants. These activities will be executed in order to meet project goals (listed below). Project goals will each have performance measures that will be used to quantify and verify project performance.

Project Goals

Reduce urban water consumption: The following methods will be employed to accurately monitor urban runoff consumption; surveys or other market research, list of conservation events, number of attendees at events, number of certified professionals at events, impact analysis, and site evaluations. Increased conservation events and attendees reveal that urban water consumption is being widely recognized and that reduction efforts are being considered.

Modification of long-term landscape behavior: Landscape behavior will be tracked by pre- and post- water use evaluations. Pre- and post- modification water use data will be obtained from local water agencies and analyzed to determine the program's effectiveness. Landscape sites that will be modified will thus be monitored for long-term efficiency. The analysis will require the administration of surveys or other market research techniques to determine satisfaction. Additionally, multivariate regression analysis will control for and or identify the impact of project variables (i.e. weather, location, economic status). Site evaluations may be conducted to determine pre- and post-performance ultimately showing how long-term landscape behavior has been modified. The analysis will rely on a representative sample.

Promotion of Stewardship: Increased environmental awareness is a goal for this project because it will lead community members to feel a greater duty to conserve. To assess the progress of promoting stewardship and increasing community involvement the project will use surveys or other market research as measurement tools. As mentioned earlier, a list of conservation events, number of attendees at events, number of certified professionals at events, impact analysis, and site evaluations will be collected. The quantification of citizen participation will mark progress toward environmental stewardship.

Diversify water supply: Water supply diversification will be measured by pre-and post-retrofit water use records. Diversifying water supply will be achieved by reducing dependence on imported water supplies. Measuring pre- and post- retrofit water use will determine if average water use reductions are occurring. Water use reductions will lead to reduced dependence on imported water and will serve as an indicator for progress towards achieving water supply diversification.

Improve water quality: Poor water quality has been linked to increased runoff due to irrigation and from land development practices that result in compacted soil. This project will perform a recorded visual observations program to observe runoff flow and its conditions. Monitoring efforts will be compared to previous observations to estimate whether runoff has been reduced and water quality has been improved.

Improve soil quality: Increased soil health is correlated with increasing depth of topsoil. To monitor soil quality improvements the project will perform recorded visual observations and site evaluations to document soil measures. Monitoring increasing soil depth will provide measurements for improving soil quality.

Reduce wet weather runoff: First flush wet weather runoff has been known to contain high levels of pollutants due to dry weather build-up. The retention of the “first-flush” and the effective reduction of wet weather runoff will increase water quality. To quantify reduced wet weather runoff, a recorded visual observations program will be implemented. Measurement tools used to quantify the amount of rain/wet weather runoff will include rain barrels and other rain capture devices that will be implemented as a result of LID construction and maintenance processes.

Monitoring System

Pre- and post-water use data will be obtained from local water agencies and analyzed to determine the program's effectiveness. It is anticipated that the analysis will require the administration of surveys or another market research technique to determine satisfaction. Additionally, it is anticipated that multivariate regression analysis will control for and or identify the impact of project variables (i.e. weather, location, economic status). It is also anticipated that site evaluations may be conducted to determine pre- and post-performance. The analysis will rely on a representative sample.

The results of the regression and survey analysis will be compared to performance goals (see above) to determine effectiveness. The goals above are consistent with the IRWM Plan.

The project will incorporate elements of stormwater management. Reduced irrigation will result in less runoff and loading of pollutants. These elements will help the San Diego RWQCB and stormwater Copermittees achieve the TMDLs.

**Table 6-1: Performance Measures Table
Sustainable Landscapes Program**

Benefit Type	Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Water Conservation	Reduce urban water consumption	Successful implementation of Regional Sustainable Landscapes Program	6.25 acres retrofitted (landscape); Over 25 Regional Sustainable Landscape program Events (Trainings, Workshops)	Change in behavioral norms so that water conservations is a priority and duty; Post retrofit/conversion water use reduction	Surveys or other market research; list of conservation events; number of attendees; number of certified professionals; impact analysis; site evaluations	Water savings of 180 AF over 10 years.
Water Conservation	Modification of long-term landscape behavior	Reduced landscape irrigation demand at participating sites	6.25 acres retrofitted (landscape)	Net difference between pre- and post-retrofit water use; Change in behavioral norms so that water conservation is a priority and a duty; change in customer choices (landscape equipment, landscape trained professionals, water efficient plants)	Customer pre- and post-retrofit water use records; survey; site evaluations	Average water use reduction of 30% for retrofit sites
Stakeholder Involvement	Promotion of Stewardship/ Increased Community Involvement	Increased conservation awareness/Greater duty to conserve	Over 25 Regional Sustainable Landscape Program Events (Trainings, Workshops)	Change in behavioral norms so that water conservation is a priority and duty	Surveys or other market research; list of conservation events; number of attendees; number of certified professionals; impact analysis; site evaluations	Water savings of 180 AF over 10 years.
Water Supply Diversification	Diversify Water Supply	Reduced dependence on imported water supplies	6.25 acres retrofitted (landscape)	Net difference between pre- and post-retrofit water use.	Customer pre- and post-retrofit water use records	Average water use reduction of 30% for retrofit sites

Benefit Type	Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Water Quality Improvement	Improve Water Quality	Reduced runoff due to over-irrigation and from land development practices that result in compacted soil	participating sites with visible evidence of run-off	% reduction in dry weather runoff - retrofit areas	Recorded visual observations	% Reduction in observed dry weather runoff
Improved Soil Quality	Improved Soil Quality	Increased depth of healthy soil	Maximum of 6.25 acres of soil amended	Increase in presence of micorriza	Recorded visual observations; site evaluations	Increased presence of micorriza
Reduce Pollutant Loading	Reduce Wet Weather Runoff	Retention of "first flush"	Placement of rain barrels/implementation of LID features	Amount captured in rain barrels/retained as a result of LID features	Recorded visual observations	Water in rain barrels post rain event or other rain capture devices

Project 2: North San Diego County Regional Recycled Water Project

The *North San Diego County Regional Recycled Water Project* will provide for a comprehensive recycled water program by consolidating North San Diego recycled water projects to meet a regional need. The project provides a sustainable, reliable, water resource for North San Diego County. Below is a list of project goals that will need to be achieved for the successful implementation of the project. To ensure that project goals are on course monitoring programs for each project goal will be established.

Project Goals

Develop and maintain a diverse mix of water resources: Customer recycled water use records will provide data that will reveal recycled water use trends. Increasing water use will indicate a greater diversity in water resources since fresh water use is being reduced. Therefore, tracking recycled water use will monitor the development of a diverse mix of water resources.

Effectively reduce sources of pollutants and environmental stressors: The successful implementation of a regional recycled water system will reduce wastewater discharges into the ocean. Effective source pollution reduction will be monitored by NPDES discharge reports for discharges associated with North San Diego wastewater agencies within North San Diego recycled water agency boundaries. Reduced pollutant concentrations reported will be a measurement tool used to determine the progress of this project goal.

Monitoring System

Baseline will be 2015 or earlier and can include 1) recycled water user reports for agencies receiving the additional recycled water, and 2) reduced ocean discharge of wastewater for wastewater agencies within the boundaries of the water agencies receiving the recycled water.

The project and associated monitoring will be consistent with NPDES monitoring reports for the San Diego RWQCB, NPDES reports for recycled water facilities, and water agency use records.

Table 6-18: Performance Measures Table
North San Diego County Regional Recycled Water

Benefit Type	Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Diverse Mix of Water Resources	Increase recycled water use	Successful implementation of regional recycled water system	# AF used amongst North San Diego agencies	Amount of recycled water used	Recycled water customer use records	Increase recycled water use by about 5,000 AFY by 2016
Reduce Sources of Pollutants and Environmental Stressors	Reduce ocean discharge of wastewater	Successful implementation of regional recycled water system reduces wastewater discharged to ocean	# gallons discharged to ocean	Amount of wastewater discharged	NPDES discharge reports for discharges associated with North San Diego wastewater agencies within North San Diego recycled water agency boundaries (adjusted for growth and other factors)	Reduce ocean discharge by about 5,000 AFY by 2016 (from current volumes)

Project 3: North San Diego County Cooperative Demineralization Project

This project aims to construct a demineralization facility to increase recycled water production, construct storm water diversion structures to divert pollutant sources, to provide a feasibility study and to provide water monitoring of water quantity and quality. To achieve these tasks, the project has identified four project goals. These goals will be monitored or assessed using measurement tools to track project completeness and progress.

Project Goals

Provide water education and outreach: The project will include a count of the number of public outreach events (environmental fairs, etc.) attended by project partners (with an emphasis on the local water issues driving this project), a count of the number of visitors to visitor centers that have project-specific exhibits, and a count of the number of residents on tours given by project partners that feature the water issues driving this project. This tally of citizen participation will successfully measure water education and outreach performance.

Increase recycled water production capacity: This project intends to increase recycled water production by construction a demineralization facility that will have the production capacity of 560 acre feet/year. The effectively measure if recycled water production has increased flow monitors will be put into place and observations will be performed. An account of the total reclaimed water flow-rate capacity (increased by 560 AFY) by the SEWRF after project construction and a completed study on the feasibility of constructing a brackish groundwater to potable water facility will be performed.

Construct demineralization facility: The measurement tool used to identify the progress of demineralization facility construction will be observations. Construction and planning can be identified and verified by visual observations.

Construct diversion facilities/structures: Construction of facilities/structures to divert high-TDS low-flow/first flush urban runoff from the San Elijo Lagoon will alleviate the impacts of environmental stressors. Currently, as part of its NPDES Permit, the SEJPA routinely monitors the flow rate and TDS (and other constituents) of its recycled water. A summary of constituents monitored and the average, minimum, and maximum values can be found in the demineralization facility preliminary design report. The San Elijo Lagoon Conservancy monitors various parameters in the San Elijo Lagoon on a regular basis in order to monitor the health of the San Elijo Lagoon. The bacteria count at the Seascape Sur HOA storm drain is monitored monthly and analyzed at the SEJPA laboratory. All monitoring efforts will continue after this project is completed. Diversion facilities and structures will reduce TDS concentrations. The continuation of monitoring will make certain that the objectives of this project goal are being reached.

Monitoring System

Baseline data for this project is routinely collected as part of general operations, NPDES permits, non-government organization efforts, or other means. The project partners have historically attended local environmental fairs to open a dialogue with the public about water issues. These historic efforts can be used as the baseline for stakeholder involvement. As part of its NPDES Permit, the SEJPA routinely monitors the flow rate and TDS (and other constituents) of its recycled water. A summary of constituents monitored and the average, minimum, and maximum values can be found in the demineralization facility preliminary design report. The San Elijo Lagoon Conservancy monitors various parameters in the San Elijo Lagoon on a regular basis in order to monitor the health of the San Elijo Lagoon. The bacteria count at the Seascape Sur HOA storm drain is monitored monthly and analyzed at the SEJPA laboratory. All monitoring efforts will continue after this project is completed.

The monitoring data collected as part of this project often directly correlates to meeting specific goals and objectives of the IRWM Plan using specific strategies outlined in the IRWM Plan. Monitoring data used to measure the performance of this project meeting Objective A of the IRWM Plan include a count of the number of public outreach events (environmental fairs, etc.) attended by project partners (with an emphasis on the local water issues driving this project) a count of the number of visitors to visitor centers that have project-specific exhibits, and a count of the number of residents on tours given by project partners that feature the water issues driving this project. Monitoring data used to measure the

performance of this project meeting Objective D of the IRWM Plan includes an account of the total reclaimed water flow rate capacity (increased by 560 AFY) by the SEWRF after project construction and a completed study on the feasibility of constructing a brackish groundwater to potable water facility. Monitoring data used to measure the performance of this project meeting Objective E include an account of the total reclaimed water flow rate capacity by the SEWRF after project construction and a completed study on the feasibility of constructing a brackish groundwater to potable water facility. Monitoring data used to measure the performance of this project meeting Objective G of the IRWM Plan includes monitoring performed by the San Elijo Lagoon Conservancy and City of Solana Beach and an accounting of additional storm water diversion structures constructed as part of this project (two storm water diversion structures will be constructed as a part of this project, a third is made possible by this project and will be constructed by CALTRANS once the Manchester Avenue Exit is updated as part of the I-5 Widening Project).

A majority of the monitoring performed as a part of this project will be performed as part of an existing NPDES Permit using approved methods and with analysis performed by laboratories accredited to perform each analysis. As part of the NPDES Permit, monitoring is performed on a routine basis to ensure constituents released from facilities (or treated by facilities) do not exceed permit limitations (which are set by basin plan and ocean plan limitations). This project has been designed to help reduce TDS, Chlorides, Boron, Fluoride, Sulfate, Sodium, Iron, Manganese, and Nitrate in the recycled water that is distributed throughout the SEWRF's service area. These constituents are prescribed limits in the San Diego Basin Plan, and this project will help to reduce the loading rates of these constituents to the basin.

Table 6-20: Performance Measures Table
North San Diego County Cooperative Demineralization Project

Benefit Type	Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Community Outreach	Provide water education and outreach to over 43,000 residents of North San Diego County.	Reach over 43,000 Residents with water education and outreach, including in regions served by disadvantaged communities.	* # students through SEWRF tours. * # environmental fairs attended by project sponsors. * # participants through Elfin Forest Recreational Reserve, where project exhibited	* Public Awareness of the water issues facing our region	* Public surveys and questionnaires	Conduct water management outreach and solicit input from regions population, including underserved and disadvantaged communities.
Diverse Mix of Water Resources	*To increase recycled water production capacity by 560 AFY. *To explore the feasibility of expanding brackish groundwater to potable water production by 1120 AFY.	*Construct an operable 560 AFY demineralization facility at the SEWRF. *Complete a feasibility study for a brackish to potable water desalination facility.	*Maximum recycled water production from SEWRF. *Completed Feasibility Study.	Amount of reclaimed water production capacity (AFY) increase at SEWRF.	*Flow Meters *Observations	*Increase recycled water production capacity by 560 AFY. *Planning for an increase in brackish groundwater to potable water production capacity by 1120 AFY
Construct Reliable Infrastructure	To construct and plan for the construction of infrastructure that increases local water supplies.	*Construct and operable 560 AFY demineralization facilities at the SEWRF. *Complete a feasibility study for a brackish to potable water desalination facility.	*Construction Notice of Completion *Completed Feasibility Study	Construction and Planning Milestones Completed	Observations	*Develop facilities and manage supplies to ensure adequate emergency and carry-over deliveries. *Develop the infrastructure needed to support recycled water
Manage Impacts to San Elijo Lagoon and Pacific Ocean	To construct facilities to divert high-TDS low-flow and/or first flush urban runoff from the San Elijo Lagoon and the Pacific Ocean to the SEWRF for treatment.	*Construct diversion structures at Seascape Sur HOA in Solana Beach and the regional storm drain channel at the SEWRF to divert pollution sources from the San Elijo Lagoon and the Pacific Ocean to the SEWRF for treatment.	*Construction Completion*Diversion Structures Operable	*Water Quality studies in the SE Lagoon*Monthly storm water sampling.*Construction Milestones Completed	Sample/Data Collection and Laboratory Analysis	*Reduce Mass Emissions of pollutants in receiving waters. *Number of storm water diversion structures implemented.

Project 4: Rural Disadvantaged Community (DAC) Partnership Project

The goal of the *Rural DAC Partnership Project* is to provide funding to address inadequate water supply and water quality affecting rural DACs, including tribal communities. The project will reduce potential for high public health risks in water and/or wastewater systems. Project goals and monitoring programs created to measure their progress are listed below:

Project Goals

Provide outreach and funding to DACs: Outreach and funding will be used to fund capacity development and sustainability projects. The California Department of Public will perform a technical, managerial, and financial (TMF) capacity assessment of public water systems. The TMF capacity assessment will have a list of elements that will need to be addressed; one element specific to this project goal will be the 'source capacity assessment and evaluation'. This element requires each community water system to evaluate its anticipated growth and water demand and to compare this with its existing source capacity and ability to deliver water. The comparison will help a water system anticipate needed changes or additions to their sources in order to allow them to plan accordingly.

The TMF capacity assessment will indicate if there has been capacity development. The evaluation will also reveal water system issues and needs that can be mitigated by sustainability efforts. The TMF capacity assessment, in practice, will be the measurement of progress since the assessment cannot be performed without funding to the DACs. The initiation of the capacity assessment is therefore, the indicator of successful outreach and funding to DACs.

Incorporate efficient use of water supplies and energy resources into DAC projects: Efficient use of finite water supplies and energy resources will be incorporated into DAC projects when appropriate and affordable. To measure the performance of this project goal, water and energy audits will be performed on approved DAC projects. By implementing these audits, the incorporation of efficient use of water supplies and energy resources will be monitored and trends can be observed to determine if project goals are being met.

Implement projects that will solve DAC critical water system issues (water infrastructure): Selection of DAC projects for funding will be decided by stakeholder/ community decision makers with additional educational meetings to inform citizens of the importance of environmental stewardship emphasizing conservation, renewable energy, and utility efficiency. Measurements that will indicate that projects are implemented and will solve DAC critical water system issues include the successful completion of the project and verbal conversations, written conversations or written correspondence with regulators. Recorded communications will signify DAC critical water infrastructure project implementation.

Address public health risks (water infrastructure): Inadequate water supply to support existing communities is a public health risk. The project will reduce potential for high public health risks in water and/or wastewater systems by providing funding to address these concerns. To effectively measure if these health risks are being addressed, the project proposes to verify the successful completion of the project and system compliance with state and local regulations as indicators. The completion of a public health risk project and its conformance to state and local regulations reduces public health risks regarding water infrastructure.

Implement projects that will solve critical wastewater system issues (reduce sources of pollutants and environments stressors): The same measurement methods used for the Implement projects that will solve DAC critical water system issues (water infrastructure) project goal will be applied for this project goal. Measurements that will show that pollutant source related issues are being solved include the successful completion of the project and verbal conversations, written conversations or written correspondence with regulators. Recorded communications will signify whether DAC wastewater systems projects concerning source pollutants are being implemented.

Address public health risks (reduce sources of pollutants and environments stressors): The same measurement methods used for the Address public health risks (water infrastructure) project goal will be applied for this project goal. To effectively measure if source pollutant related health risks are being

addressed, the project proposes to verify the successful completion of the project and system compliance with state and local regulations as performance indicators.

Monitoring System

Projects will be solicited from rural DACs and assessed based on the following factors: 1) public health risks, 2) environmental justice, 3) multiple benefits, 4) affordability and sustainability, 5) incorporation of green technologies. Projects selected will have specific outcomes that solve a water or wastewater quantity or quality problem. Community needs data will be collected at the time of project selection. Output indicator data will be requested from each selected community. Upon completion of the project, outcome indicators will be assessed. Communities will be evaluated for future needs and resources provided.

Table 6-14: Performance Measures Table
Rural DAC Partnership Project

Benefit Type	Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Maximize Stakeholder Involvement and Stewardship	Provide outreach and funding to DACs, including tribal communities, to achieve capacity development and sustainability	Bring DACs education and money to increase system capacity	<ul style="list-style-type: none"> *Increased compliance with regulations *Conduct site visits to determine capacity change *Complete TMF capacity assessments to determine initial and change due to project *Increased expertise at system level 	<ul style="list-style-type: none"> *Increased TMF capacity score *Successful project completion 	*CDPH (UCDavis) TMF capacity assessment for water systems	<ul style="list-style-type: none"> *Increased technical capacity score for water system *Records kept for future DAC needs *DAC in compliance with regulations
Maximize Stakeholder Involvement and Stewardship	Incorporate efficient use of water supplies and energy resources into DAC projects when appropriate and affordable	DAC adopts water and energy use efficiency programs	<ul style="list-style-type: none"> *Reduction in water use *Reduction in energy use 	<ul style="list-style-type: none"> *Reduction in water use *Reduction in energy use 	<ul style="list-style-type: none"> *Water audit *Energy audit 	
Construct and Maintain a Reliable Water Infrastructure	Implement projects that will solve DAC critical water system issue	Reduce public health risk	*In compliance with state and local regulations	*In compliance with state and local regulations	<ul style="list-style-type: none"> *Successful completion of project *Verbal conversations and written correspondence with regulators 	<ul style="list-style-type: none"> *Develop facilities to ensure adequate supply *DAC in compliance with regulations
Construct and Maintain a Reliable Water Infrastructure	Address public health risks found in DACs providing water and/or wastewater services	Remove or reduce of public health risk(s)	*In compliance with state and local regulations	*In compliance with state and local regulations	<ul style="list-style-type: none"> *Successful completion of project *System in compliance with state and local regulations 	*DAC in compliance with state and local regulations
Reduce Sources of Pollutants and Environmental Stressors	Implement projects that will solve DAC critical wastewater system issue	Reduce public health risk	*In compliance with state and local regulations	*In compliance with state and local regulations	<ul style="list-style-type: none"> *Successful completion of project *Verbal conversations and written correspondence with regulators 	*DAC in compliance with state and local regulations
Reduce Sources of Pollutants and Environmental Stressors	Address public health risks found in DACs providing wastewater service	Remove or reduce of public health risk(s)	*In compliance with state and local regulations	*In compliance with state and local regulations	<ul style="list-style-type: none"> *Successful completion of project *System in compliance with state and local regulations 	<ul style="list-style-type: none"> *Reduction in number and volume of sewer spills *DAC is in compliance with regulations.

Project 5: Lake Hodges Water Quality and Quagga Mitigation Measures

The *Lake Hodges Water Quality and Quagga Mitigation Measures* will evaluate available methods to improve water quality within Lake Hodges and prioritize implementation of those methods. Project benefits include decreased reliance on imported water supplies, greater technical knowledge, stakeholder involvement and prioritization of methods to improve Lake Hodges water quality. To ensure that these benefits are fully achieved, project goals are established and measured for progress. Below is a description of the performance measures that will be used to quantify and verify project performance:

Project Goals

Coordinate Efforts to improve water quality in Lake Hodges: Coordinating efforts will create increased stakeholder involvement benefits and water quality improvement benefits. To measure coordination of efforts, stakeholder meetings with periodic comparison of project tasks will be counted. Increased stakeholder meetings will show that coordination efforts to improve water quality in Lake Hodges are increasing.

Make Technical Information available: Greater availability of technical information will give this project an opportunity to share its methods with other agencies to improve water quality and infrastructure conditions. Technical information availability can be tracked by counting the number of e-mails or other direct communications that distribute technical information.

Decrease reliance on imported water supplies: Decreasing reliance on imported water supplies will be achieved through infrastructure maintenance. The project will utilize a SCADA system output or spreadsheets to quantify reliance on imported water supplies.

Protect regional water treatment infrastructure: The project will assess the **number of days the delivery system is shut down due to poor water quality** in order to quantify the value of protecting this regional water treatment infrastructure.

Produce a plan to decrease levels of pollutants in Lake Hodges: A detailed project schedule will verify that a plan is being produced to decrease levels of pollutants in the lake. As tasks are complete from the schedule, it will serve as an indicator of plan production and plan implementation.

Control Quagga Mussel Population: Quagga mussels populations reside in the Lake Hodges Pumped Storage (LHPS) facility. High levels of quagga mussels have been associated with LHPS facility shutdown. This project goal will be implemented to maintain the facility's ability to operate. To verify that quagga mussel populations are, in fact, being controlled, assessments of shutdown schedule and the frequency of shutdown will reflect whether mussel populations have increased or decreased.

Monitoring System

Monitoring data can be tied to objectives cited in the IRWM plan, but they are separate from the designated targets for achieving objectives and parameters for measuring success. Those targets and parameters that will be affected by the progress of this project include: (1) developing facilities and managing supplies for adequate emergency and carry-over deliveries, (2) implement TMDLs according to established schedules, (3) avoid or reduce need for TMDLs, and (4) develop comprehensive source management strategies.

This project deals with water bodies and facilities in the San Dieguito Hydrologic Unit. This project addresses components of the Regional Board Water Quality Management policies #3 and #5 as listed in chapter one of the San Diego Basin Plan (Basin Plan). It also addresses water quality objectives shown in chapter three of the Basin Plan.

Table 6-10: Performance Measures Table
Lake Hodges Water Quality and Quagga Mitigation Measures

Benefit Type	Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Stakeholder Involvement	Coordinate efforts to improve water quality in Lake Hodges	Multiple project efforts are coordinated and not duplicated	List of specific water quality improvement measures to be made or explored	Non-duplicative scope of work/task schedule	Stakeholder meetings with periodic comparison of project tasks	A list of water quality improvement projects including responsible party
Technical Information Availability	Make technical information available to agencies who may be considering similar applications	Area water agencies have access to updated product evaluation or control measures evaluated by SDCWA	# of sites where notice of info availability can be posted	# of agencies requesting data	E-mail or other direct communications	All requesting agencies receive data
Source Water Diversification	Decrease reliance on imported water supplies through infrastructure maintenance	Maintain ability to move water in/out of Lake Hodges	AFY available for movement in/out of reservoir	AFY requested but not moved	SCADA system output or spreadsheets	All water requested is moved
Infrastructure Reliability	Protect regional water treatment infrastructure by making plans to improve Lake Hodges water quality	Prioritized list of water quality improvement projects	# of water agencies treating Lake Hodges water	Avoidance of added water treatment costs due to degraded water quality from Lake Hodges	# of days delivery system shut down due to poor water quality	Minimal delivery system shut-downs
Pollutant Reduction	Produce a plan to decrease levels of pollutants in Lake Hodges that contribute to its 303(d) listed water body status	Plan produced	Detailed project schedule	Completed tasks from schedule	project schedule	Generate priority list with expected reductions in pollutant levels
Infrastructure Reliability/ Environmental Stressors	Control quagga mussel population in Lake Hodges Pumped Storage (LHPS) facility and evaluate the ability to reduce numbers of viable quagga mussels in connected reservoirs	Maintain ability to operated the LHPS facility	# of hours facility available for operation	# of hours/days facility shut down exclusively for quagga removal	spreadsheet/shutdown schedule	No facility shutdowns exclusively for quagga removal

Project 6: Implementing Nutrient Management in the Santa Margarita River Watershed

The *Implementing Nutrient Management in the Santa Margarita River Watershed* project aims to establish nutrient water quality objectives (WQOs) for the Santa Margarita River estuary (Phase I) and ultimately watershed (Phase II) that will lead to the implementation of nutrient reduction and water conservation practices in the watershed. The project seeks to incorporate stakeholder groups and community members in WQOs decision making. Development of nutrient WQOs for SMR watershed is an important goal of this project. To make certain that the right steps are being made toward successful nutrient management, project goal progresses are tracked by monitoring and assessment protocols. Below is a list of project goals followed by their progress tracking method:

Project Goals

Increase stakeholder involvement and stewardship: Stakeholder involvement is central to the goals of the project. The measurement tools used to assess this project goal will include the totaling of the number of stakeholder meetings and the degree of diversity of the list of stakeholders. Increased meetings will indicate greater participation opportunities for WQOs planning and increased diversity will show that a larger mix of population is being reached for a more widely accepted WQOs planning process.

Further the scientific and technical foundation of water quality management: The project will utilize and expand the existing watershed-wide hydrology and water quality database furthering the scientific and technical foundation of water quality management. To track the progress of this project goal the same measures as described above will be used. Improving the technical foundation of water management will include demonstrating an innovative approach to establish nutrient WQOs by using open source models and making presentation to stakeholders. Consequently, the method of counting stakeholder meetings and determining the diversification of stakeholders will be a marker for the progress of this project goal.

Develop and maintain a diverse mix of water resources: Through development and adoption of a Basin Plan Amendment that incorporates the Site Specific WQOs for nutrients to Santa Margarita River and watershed, local water purveyors may be allowed to deliver recycled water to augment river flows. This shift from MWD imported water supplies to recycled water supplies allows for use of a more diverse mix of water resources during river management. Use of the proposed WQOs (from Phase II) in San Diego RWQCB's staff report for consideration of a Basin Plan Amendment would indicate project success.

Protect and maintain habitat and open space: This project will develop nutrient WQOs that will help reduce sources of pollutants and will help protect and maintain habitat and open space. To quantify the amount of habitat and open space preserved, a monitoring and special studies report will be compiled. The report will include the percentage of habitat coverage of the study area.

Monitoring System

The State Water Quality Control Board's Surface Water Ambient Monitoring Plan protocols will be used to conduct field studies. Modeling efforts will use open source codes and collaborate with the Stakeholder Advisory Group which will include staff from the San Diego Regional Water Quality Control Board. Monitoring will allow project proponents to determine the progress of the protection and maintenance of habitat and open space.

Development of site-specific water quality objectives will aid in the development of TMDLs for nutrients in the Santa Margarita Watershed. Development of the nutrient TMDLs will provide targets for the reduction of nutrients to the watershed. These targets may require implementation of source control or other best management practices to reduce nutrients in the river and estuary to protect beneficial uses.

Table 6-8: Performance Measures Table
Implementing Nutrient Management in the Santa Margarita River Watershed

Benefit Type	Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Stakeholder Involvement	Increase stakeholder involvement and stewardship	Achieve consensus on recommending water quality objectives for nutrients in the Santa Margarita Estuary	* List of Stakeholders *Stakeholder meeting notes and No. of attendees	* Increase in general knowledge of the effects of nutrients in Santa Margarita Lagoon	* # of stakeholder meetings * Diversity of the list of stakeholders	Broad acceptance by stakeholders of the proposed WQOs.
scientific and Technical Foundation of Water Quality Management	Further the scientific and technical foundation of water quality management	Demonstrate an innovative approach to establishing nutrient WQOs by using open source models, publishing results in peer-reviewed scientific literature, and making presentations to stakeholders, thus improving the technical foundation of water management.	* List of Stakeholders *Stakeholder meeting notes and No. of attendees	Successful completion of Modeling Report	* # of stakeholder meetings * Diversity of the list of stakeholders	RWQCB Consideration of a Basin Plan Amendment for a Site Specific WQO for nutrients to Santa Margarita Lagoon
Diverse Mix of Water Resources	Develop and maintain a diverse mix of water resources	WQOs for the Santa Margarita River will be developed to protect beneficial uses and possibly allow delivery of recycled water to river.	Collaboration with RWQCB staff on WQOs and Basin Plan Amendment	Use of proposed WQOs in San Diego RWQCB's staff report for consideration of a Basin Plan Amendment	* Use of proposed WQOs in San Diego RWQCB's staff report	*Adoption of Basin Plan Amendment allowing delivery of recycled water to augment river flows
Protect and Maintain Habitat and Open Space	Protect and maintain habitat and open space	Improve understanding of nutrient processes in SMR River watershed to protect beneficial uses.	# of sites sampled	% sample coverage of study area	Monitoring & Special Studies Report	Use results of these studies to in Phase II develop a site-specific nutrient WQOs for Santa Margarita River

Project 7: Bannock Avenue Neighborhood Streetscape Enhancements for Tecolote Creek Watershed Protection

The *Bannock Avenue Neighborhood Streetscape Enhancements for Tecolote Creek Watershed Protection* project is intended to reduce the pollutant load and volume of runoff entering the storm drain system in the Tecolote Creek watershed. To ensure that the project meets intended goals, assessments or monitoring programs will be implemented to document progress. Below is a description of each project goal and their corresponding monitoring efforts:

Project Goals

Increase community awareness of storm water pollution prevention: To monitor the successfulness of community awareness programs the project will coordinate public survey and questionnaire dispersals to measure awareness level.

Increase landscape irrigation efficiency: Pre-construction monitoring, sampling and analysis and post-construction monitoring, sampling and analysis will be performed to quantify total pollutant load reductions. The data collected for these monitoring efforts will determine if landscape irrigation efficiencies have been achieved which will lead to reduced volume runoff (one of the project goals).

Mitigate impacts of hydro-modification: Storm water flows have been known to increase due to hydro-modification (urbanization and the installation of large impervious pavement areas) transporting concentrations of contaminants. To reduce runoff inundation into storm drain systems (which drain into Mission Bay), the project will increase infiltration opportunities on impervious surfaces. To monitor decreases in runoff, this project will employ flow monitors to measure storm water flows. The measureable target for this objective is to reduce flow measured as seen from post-construction compared to pre-construction conditions.

Reduce indicator bacteria and other pollutants: The water quality monitoring effort, as mentioned above, will employ automated samplers and flow meters to collect flow-weighted composite samples throughout entire storm events from each of the monitoring locations. Grab samples will be collected during peak discharge for microbiological analyses. To effectively estimate the reduction (or change) in analyte concentrations, the quantity and quality of runoff entering the BMPs will be compared to the quantity and quality of water discharged from the BMPs and/or preconstruction sampling and monitoring data at the same locations. This data will allow a direct estimate of the total reduction in mass loadings and removal rates for a variety of contaminants. Water Quality monitoring will include both dry weather and wet weather monitoring components to include a complete range of data from which to measure performance.

Improve water quality in Mission Bay thereby improving recreational opportunities such as swimming: The Tecolote Creek watershed drains into Mission Bay which provides many recreational and aesthetic benefits. By implementing this project, excessive bacteria loading from urban runoff entering Mission Bay will be reduced. Reducing runoff due to over-irrigation will be monitored by water quality sampling and analysis. Automated samplers and flow meters will collect flow-weighted composite samples during storm events. Runoff quantity will be measured which will allow for the direct estimate of total reduction of runoff volume.

Monitoring System

Data for the effectiveness assessment will be gathered from sampling and analysis from preconstruction (baseline) and post construction water quality monitoring which will be collected at the locations of at least three and storm water curb inlets of where the storm water filtration units are to be located at the site. In addition to the influent and effluent of the storm drain pipeline to be bypassed for the future inline bacterial treatment system (BTS) and hydrodynamic separator. At least 8 storm events should be sampled at each monitoring location during the wet season (October through May). For the first two storm events, an operational assessment of the BMPs will be conducted to ensure that the BMPs and the monitoring equipment are functioning properly. Field crews will observe and document any operational issues at the filtration units, and bacterial treatment system basin. Flow rates will be measured during these first two events; however, water quality samples will not be collected until it can be verified by on-site field crews that all equipment is operating properly.

The water quality monitoring effort will employ automated samplers and flow meters to collect flow-weighted composite samples throughout entire storm events from each of the monitoring locations. Grab samples will be collected during peak discharge for microbiological analyses. To effectively estimate the reduction (or change) in analyte concentrations, the quantity and quality of runoff entering the BMPs will be compared to the quantity and quality of water discharged from the BMPs and/or preconstruction sampling and monitoring data at the same locations. This data will allow a direct estimate of the total reduction in mass loadings and removal rates for a variety of contaminants.

Constituents selected for this Effectiveness Assessment study to be constructed for these BMP are prioritized into Tier 1 and Tier 2 categories. Tier 1 constituents are considered a priority for water quality monitoring in this study because they are; 1) consistent with other BMP monitoring guidance to address street runoff such as the Caltrans Guidance Manual: Storm Water Monitoring Protocols (Caltrans, July 2000); 2) specifically identified as constituents of concern in the Tecolote Creek watersheds and/or subject to a TMDL; or 3) consistent with other City monitoring efforts currently underway in the watershed, such as the San Diego Bay Watershed Urban Runoff Management Program, and the Chollas Creek Storm Drain Characterization Study. Tier 2 constituents may also have been identified as pollutants of concern in the subject watersheds; however, adding these constituents may need to be considered in light of the available budget for sampling and analyses. Evaluation of pollutant removal effectiveness of Tier 2 constituents may also be of interest if implementation of these BMPs is being considered in other watersheds with specific water quality concerns.

Estimates of the number of samples required to yield statistically valid monitoring results are necessary for making decisions about the nature and extent of monitoring efforts. For this study, the appropriate number of samples is the number required to discern a significant difference between the influent and effluent. The sample size will depend on the specified mean percent constituent removal rate desired. Because of the variability of rainfall and runoff quality, it is necessary to sample a number of storms to generate statistically reliable answers to the study questions. The number of samples needed depends upon the variability in the data, the magnitude of the effect being studied, and the degree of confidence desired in the answer.

These BMPs would not be implemented if they did not remove a significant fraction of the constituent of concern. The most commonly used confidence level in scientific studies is 95 percent. However, due to the high variability in storm water data, use of a 95 percent confidence level results in an impractical number of samples, or masks the effectiveness of BMPs known to remove pollutants. For this reason, a 90 percent confidence level is appropriate for BMP pilot studies and is the confidence level chosen for this study. The statistical procedure used to estimate the number of samples required is described in the Caltrans BMP Pilot Study Guidance Manual.

Storm selection criteria described for this effectiveness assessment studies will likely entail a minimum 0.25 inch of rainfall and 72 hour antecedent dry period, an average of 8 storms per year can be expected. A minimum of 8 samples are required. Consideration must also be given to the number of unproductive monitoring events that are likely to occur. Rainfall may not happen as predicted, or may be of insufficient quantity (i.e., a "false start").

Samples can also be missed due to problems with autosamplers. When planning a study, it is reasonable to assume that one out of four sampling events will be unsuccessful. In addition an operational assessment of the BMPs will be conducted during the first two storm events to ensure that the BMPs and the monitoring equipment are functioning properly. Field crews will observe and document any operational issues at the filtration units and the bioretention cells. Flows will be measured during these first two events; however, water quality samples will not be collected until it can be verified by on-site field crews that all equipment is operating properly. Therefore, considering two storm events for the operational assessment and assuming two unproductive sampling events for the required minimum 8 storms, the anticipated duration of the study would be a total of 12 storm events. Therefore it is anticipated that the study period will be 2 years.

The data collected from the preconstruction baseline water quality monitoring and the post construction water quality and performance monitoring will be used to measure the effectiveness of the installed BMP in reducing peak storm flows for the 85th percentile storm and the effectiveness in reducing pollutant loads of bacteria, metals, trash and other pollutants sources from urban runoff. A study will be completed

to assess and compare the effectiveness of using these methods for both the design and the selection of the low impact development infrastructure and physical BMP's selected in comparison to other LID/BMP approaches to source control and pollutant removal. An estimate will be made as to the total peak flow and pollutant load reduction that can be expected on an annual basis and for the lifecycle of the improvements and figures extrapolated and projected assess their effectiveness in addressing the objectives and goals for the Tecolote Creek Watershed and Mission Bay for this project in particular and this type of project throughout the watershed.

The sampling and analysis under this project will be consistent with the objectives of Chapter 6 (Surveillance, Monitoring and Assessment) of the San Diego Regional Basin Plan. The sample protocols will be adopted from the SWAMP protocols, analytes, detection limits and sample collection methodologies. The list constituents of concern in urban discharges include outlines in that chapter, namely: total and fecal coliform, enterococcus, total suspended solids, biochemical oxygen demand, chemical oxygen demand, total organic carbon, oil and grease, heavy metals, nutrients, base/neutral and acid extractables, pesticides, herbicides, petroleum hydrocarbon products, and/or those causing extremely high or low pH, will be included in the list of analytes to be included in the preconstruction baseline monitoring and the post construction effectiveness assessment monitoring. Water Quality monitoring will include both dry weather and wet weather monitoring components to include a complete range of data from which to measure performance.

Table 6-6: Performance Measures Table
Bannock Avenue Neighborhood Streetscape Enhancements for Tecolote Creek Watershed Protection

Benefit Type	Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Community Involvement and Stewardship	Increase community awareness of storm water pollution prevention	Successful implementation of storm water pollution prevention outreach campaign	* # Community project meetings and education sessions * # water storm water pollution events (workshops, fair exhibits, etc) conducted	* Change in attitude about storm water pollution and urban runoff	* Public surveys and questionnaires * List of pollution prevention events	Increased awareness of the infiltration project, storm water runoff and storm water pollution impacts to Tecolote Creek.
Effectiveness Assessment	Increase landscape irrigation efficiency	Data and information of the effectiveness of the infiltration project design in removing pollutants.	Infiltration project output (storm water runoff flow) and total pollutant load.	Reduced storm water runoff flows and reduced pollutant loads	Pre- construction (background) monitoring, sampling and analysis and post-construction monitoring sampling and analysis	Total pollutant loads reduction.
Reduction in Storm Water Flows	Mitigate impacts of hydromofication	Reduction in storm water flows for 85th percentile storm.	Total storm water flow from project drainage area into Tecolote Creek.	Reduced storm water flow from the 85th percentile storm.	storm water flow measurements.	Reduced flow measured as seen from post construction measurements as compared to preconstruction conditions.
Reduces Sources of Pollutants	Reduce indicator bacteria and other pollutants.	Achieve a 95% or greater efficiency of the 85th percentile storm (SUSUMP) event	Sampling and analysis of storm water out flows from Bacteria Treatment Systems (BTS)	Bacteria counts in samples retrieved before and after the implementation of the system (BTS).	Water quality sampling and analysis.	>90% reduction in indicator bacteria from BTS effluent.
Water Quality Improvements	Improve water quality in Mission Bay thereby improving recreational opportunities.	Reduced runoff due to over-irrigation	Infiltration project output (storm water runoff flow) and total pollutant load.	Reduced beach posting. Improvement in wet weather (post storm) sampling results.	Water quality sampling and analysis. Reduced beach post notifications.	Reduced bacteria in samples taken in wet weather.

Project 8: Pilot Concrete Channel Infiltration Project

The *Pilot Concrete Channel Infiltration Project* will convert a portion of the concrete channel in Woodglen Vista Creek (and other channels as budget/logistics permit) to a more porous base, facilitating infiltration of dry weather flows without compromising flood control capacity. The goals of this project (below) will each incorporate monitoring or assessment efforts to effectively monitor project performance.

Project Goals

Increased awareness of MS4: Increased awareness will be tracked by reviewing complaint logs and dry weather monitoring reports. By quantifying the number of inquiries about the project and the reduction of exceedances this project goal's performance will be evaluated. The comparison of previous inquiry and exceedance numbers will provide verification for awareness progress.

Share Data: Data will be collected throughout the projects lifespan will be incorporated into relevant jurisdictional, watershed, and regional urban runoff management plans. This information will be publically available so that the value of the project can be assessed and the idea implemented elsewhere. Measuring the progress of shared data can be determined by counting references in urban runoff management plans to determine to what level collaborations are being made.

Develop new type of BMP to attain water quality objectives: Construction tasks for this project will include mobilization and site preparation, project construction, and performance testing and demobilization. All three construction tasks will require upkeep of stormwater BMPs to attain water quality objectives. BMPs will be introduced to construction personnel since they will be implementing and monitoring BMP activities onsite. To measure the development of new types of BMPs, the project will count the number of presentations where new techniques were proposed. Increasing presentation counts will signify increases in new type of BMPs. BMPs help mitigate storm water runoff pollutants and the addition of new and effective BMPs will help the project move toward water quality objective attainment.

Reduce dry weather flows: Facilitating infiltration of dry weather flows will reduce the discharge of pollutants to receiving waters effectively increasing water quality. To track reductions in dry weather flows visual observation programs will be implemented. Visual observations will include flow volume evaluations and reduction in flow across the strip will be documented. Flow will be assessed by up-gradient and down-gradient of strips.

Reduce pollutants in dry weather flow: Dry weather discharges contain pollutants. One objective of this project is to reduce pollutant loads. Field screening and laboratory analysis will be performed to monitor pollutant loads to reveal any reductions. The screening and analysis will use a baseline as established by previous dry weather monitoring that was collected to comply with the municipal permit. Data collated should also include: flow, nitrate, phosphate, temperature, conductivity, turbidity (all field screening data); and bacteria (fecal coli form and Enterococci (laboratory analysis)). Additionally, flow data from up-gradient and where available, down-gradient, will be used to assess any reduction in pollutant loads.

Promote infiltration: The primary objective is to infiltrate dry weather flows. Reduction in flow will be the primary performance measure (see "reduce pollutants in dry weather flows" for monitoring methods).

Maintain flood control capacity: This project eliminates some of the disadvantages associated with a concrete channel through infiltration without losing the flood control benefits of the channel. Infiltration will reduce the volume of flows from the concrete channel but flow will continue and it is anticipated that no flooding will occur. To ensure that flood control capacity of the channel is maintained, visual observations during rain will be performed. The channel will be measured for effective functionality as a flood control device.

Monitoring System

Dry weather monitoring will be collected to comply with the municipal permit. Data collected should include: flow, nitrate, phosphate, temperature, conductivity, turbidity (all field screening data); and bacteria (fecal coliform and Enterococci (laboratory analysis)). Post-construction data will be sampled and analyzed according to a project-specific QAPP that will be developed. Flow will be assessed upgradient and downgradient of strips. Samples will occasionally be collected upgradient and downgradient of the

strips and analyzed for nitrate; phosphate; temperature; conductivity; and turbidity (all field-screening data) and fecal coliform and Enterococci (laboratory analysis).

The primary objective is to infiltrate dry weather flows. Reduction in flow will be the primary performance measure. Data up-gradient and where available, down-gradient, will be used to assess any reduction in pollutant loads.

The QAPPP and sampling will be conducted in accordance with SWAMP. The objective of the project is to facilitate infiltration of dry weather flows from the storm drain system, avoiding the discharge of pollutants to receiving waters, facilitating the attainment of water quality objectives.

Table 6-4: Performance Measures Table
Pilot Concrete Channel Infiltration Project

Benefit Type	Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Community Involvement	Increased awareness of MS4.	Reduced discharges	# of inquiries about project.	Reduction in # of exceedences.	Review of complaint log and dry weather monitoring report.	Reduction of exceedences.
Data Management	Share data.	Incorporate into WURMP report.	Inclusion in report, # of WURMP meetings when project discussed.	Yes/No	Yes/No	Enabling other program managers to access data.
Scientific and Technical Advances	Develop new type of BMP to attain water quality objectives.	Deployment in other areas.	#presentations and #projects where technique was proposed.	#presentations and #projects where technique was proposed.	#presentations and #projects where technique was proposed.	Introduction in other jurisdictions.
Promote Infiltration	Reduce dry weather flows.	Elimination of dry weather flows.	Change in flow.	Change in flow at each strip location.	Visual observations	Reduction in dry weather runoff.
Reduce Pollutants	Reduce pollutants in dry weather flow.	Measure reduction in pollutants.	Change levels of nutrients and bacteria.	Change in nutrient and bacteria levels at each strip location.	Field screening / laboratory analysis.	Reduction in nutrient concentrations and fecal coli form/ <i>Enterococci</i> counts.
Supplement Groundwater	Promote infiltration.	Eliminate flows.	Change in flow over strip.	Change in flow at each strip location.	Visual observations	Reduction in flows across strip.
Maintain Flood Control Capacity of Channel	Maintain flood control capacity.	Channel performs during rain events.	No flooding occurs.	Observe flow in channel when full.	Visual observations during rain.	Channel continues to function effectively as a flood control device.

Project 9: San Diego Regional Water Quality Assessment and Outreach Project

The *San Diego Regional Water Quality Assessment and Outreach Project* addresses the growing information and involvement gap between water agencies and the community. The project will close this gap by promoting volunteer monitoring that uses accepted monitoring and analytical methodologies, increasing public awareness and understanding of water quality data. Project goal monitoring (described below) will provide performance measures that will be used to quantify and verify project performance.

Project Goals

Assess water quality using volunteers: Bi-monthly water quality data access, analysis and interpretation workshops for community groups will be provided to properly train volunteers; greater attendance will equate to greater water quality assessment efforts. The project will conduct monthly volunteer water quality monitoring to develop a baseline for water quality in the county. Two years of volunteer monitoring results will provide valuable water quality data for assessment and trend monitoring.

Share Data: This project intends to take collected data and incorporate it into two web-based, publicly-accessible data portals. This distribution of data allows for effective management and assessment of water resources data and information by collecting and generating high quality data that is SWAMP compatible and sending that data to the state. To show that data is being shared and this project goal is being met, analytical methods and measurement quality objectives that are included in the project Quality Assurance Project Plan (QAPP) will be confirmed. The sample collection, analyses, target reporting limits, measurement quality objectives and quality control for this project are documented in a Quality Assurance Project Plan (QAPP) that has been approved by the San Diego Regional Water Quality Control Board.

Develop outreach materials: Outreach materials inform the public and address non-point source pollution. Outreach materials can include pamphlets, flyers or even Watershed Reports. To ensure that this project goal is being met the following measurement methods will be utilized: collecting sign-in sheets for monthly monitoring events and bi-monthly water monitoring training events, tallying the number of visitors on the project website (www.sdwatersheds.org) and counting the number of Watershed Reports distributed at outreach and education events. These monitoring methods will gauge how well outreach materials are distributed.

Establish regional water monitoring training and resource center: This project goal will help solidify and continue existing efforts by San Diego CoastKeeper to education and engage community members on water quality issues and to monitor water quality in local watershed. The successful performance of this project goal will be monitored by quantifying the number of people trained every month and the number of people who return for additional trainings and volunteer opportunities.

Reduce amount of gross pollutants in local waterways: The removal of gross pollutants that negatively impact watershed health is a major project goal. The total amount of gross pollutants at sampling sites observed will establish a baseline. The total amount of gross pollutants observed at sampling site thereafter will be used as assessment data to estimate whether a reduction in gross pollutants have occurred.

Gross pollutant activities such as the SWAMP approved Rapid Trash Assessment and the I Love a Clean San Diego standard volunteer protocol will serve as a measurement tool in verifying that there has been a reduction in the amount of gross pollutants in local waterways.

Monitoring System

Coastkeeper will collect 28 to 33 samples per month in nine of eleven watersheds in the county to better characterize water quality that impacts coastal waters. Monitoring sites will be inland creeks and rivers and will include testing for chemical, nutrient, bacterial and toxicity constituents of water quality. Samples will also be analyzed for dissolved metals by a contract laboratory. Bio-assessment of river and creek health will also be performed by contract services. The results will be used to augment existing monitoring of county's creeks and rivers (receiving waters) by the stormwater programs, adding to the baseline of data for those locations.

The monitoring data will be directly applicable to attaining several IRWM Plan objectives A) Maximize stakeholder/community involvement and stewardship by training volunteers to become watershed stewards; B) Effectively obtain, manage, and assess water resources data and information by collecting and generating high quality data that is SWAMP compatible and sending that data to the state; C) Further scientific and technical foundation of water quality management by increasing the amount of data available for water resource and quality protection decision making; and G) Effectively reduce sources of pollutants and environmental stressors by conducting trash removal events and preventing pollution of coastal and inland waters.

The sample collection, analyses, target reporting limits, measurement quality objectives and quality control for this project are documented in a Quality Assurance Project Plan (QAPP) that has been approved by the San Diego Regional Water Quality Control Board. The QAPP specifies that all data generated, and the reporting of that data, will be in a SWAMP compatible format.

Table 6-12: Performance Measures Table
San Diego Regional Water Quality Assessment and Outreach

Benefit Type	Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Stakeholder Outreach and Involvement	1. Assess water quality in San Diego County watersheds using trained volunteers to collect and analyze samples	Water quality constituents/ parameters will be monitored and measured on a regular basis from sites representing inland aquatic ecosystems in the San Diego region.	Two years of monthly sample data for the water quality indicators listed in table footnote #1.	Sufficient data to represent the health status of inland water bodies of the San Diego region; Improved knowledge of the baseline conditions in San Diego County watersheds	Methods to measure and analyze water quality parameters are listed in table footnote #2.	28 - 33 sites in 9 watersheds of San Diego County are sampled each month; 90% of data analyzed meets data quality objectives.
Share Data Resources	2. Share data. Data collected through this project will be incorporated in 2 web-based, publicly-accessible data portals: the water quality page on the San Diego Coastkeeper web site (http://www.sdwatersheds.org/wiki/Main_Page) and the state California Environmental Data Exchange Network (CEDEN)	Increase the amount of data available to regulatory decision makers that meets state standards for QA/QC.	The number of samples collected per watershed per year vs. the number of data points meeting QA/QC standards	Data uploaded to state water quality databases.	Analytical methods and measurement quality objectives are included in the project Quality Assurance Project Plan (QAPP)	Data is available on www.sdwatersheds.org and CEDEN (California Environmental Data Exchange Network) within 1 month of analysis
Stakeholder Outreach and Involvement	3. Develop Outreach Materials to Inform the Public and address Non-Point Source Pollution, including annual Watershed Reports	Increase the level of public understanding of watershed water quality issues. Watersheds Report printed and on-line	Water quality information and sample data posted to sdwatersheds.org page; Number of people reached in direct education campaigns (Project SWELL) and indirectly via visits to sdwatersheds.org page; Watersheds Reports distributed at	% increase in community participation in watershed stewardship activities. Increase in availability of watershed related information.	Sign-in sheets for monthly water monitoring events and bi-monthly water monitoring training events Visits to the sdwatersheds.org # of Watersheds Reports distributed at outreach and education events	10% increase in number of persons participating in monthly water monitoring events and bi-monthly water monitoring training events compared to pre-Prop 84 grant activity; 10% increase in # of visits to www.sdwatersheds.org compared to pre-

Benefit Type	Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
			outreach and education events and online resource is publicized			Prop 84 grant activity; 100 Watershed Reports distributed in report-related neighborhoods
Share Data Resources	4. Establish Regional Water Monitoring Training and Resource Center	A corps of 'citizen scientists' (i.e., volunteers) that can collect and produce QA/QC approved data	Volunteers trained by Coastkeeper to collect and analyze water quality samples per all standard operating procedures and approved QAPP	State approved QAPP for Coastkeeper Laboratory	# people trained every other month; # people who return for additional trainings and volunteer opportunities (trained volunteer retention)	100 new individuals trained in WQ monitoring and analysis. 10% increase in volunteer retention
Water Quality and Pollution Reduction	5. Reduce amount of gross pollutants (trash and litter) in local waterways	The removal of gross pollutants (trash and litter) that negatively affect the health of our local waters and can be transported downstream to potentially affect our ocean ecosystems	Regular trash removal events and a database of the type and amount of gross pollutants removed from inland waterways.	An assessment of the types of trash polluting local waterways, and an estimate of loadings of trash avoided.	Total amount of gross pollutants at sampling sites; SWAMP approved Rapid Trash Assessment in addition to I Love a Clean SD standard volunteer protocol.	10% reduction of trash collected at sampling sites 50 lbs. of itemized trash removed per cleanup event
<p>Footnotes:</p> <div> <div> 1. Two years of monthly sample data for the following water quality indicators: <ul style="list-style-type: none"> i. Temperature ii. Dissolved Oxygen iii. pH iv. Conductivity (fresh water) or Salinity (marine) v. Nitrate vi. Total Orthophosphate vii. Dissolved Metals (Cadmium, Chromium, Nickel, Lead, Copper, and Zinc) viii. Total Coliform bacteria ix. E.Coli bacteria x. Enterococci bacteria xi. Benthic macro-invertebrates xii. Toxicity </div> <div> 2. Methods to measure and analyze water quality parameters: <ul style="list-style-type: none"> i. Hach HQ40d electrometric probe ii. Hach HQ40d Luminescent Dissolved Oxygen iii. Oakton Double Junction Electrode iv. Hach HQ40d Conductivity probe v. Hach 8192 and Hach 10206 (TNT 835) vi. Hach 8048 and Hach 10210 (TNT 843) vii. Inductively Coupled Plasma Mass Spectrometer ICP-MS. EPA method 200.8 viii. IDEXX Colisure or Colilert 18 ix. IDEXX Colisure or Colilert 18 x. IDEXX Enterolert xi. SWAMP Bio-assessment procedures xii. QwikLite 200 Bio-Sensor System using ASTM E1924 </div> </div>						

Project 10: Chollas Creek Integration Project

The purpose of the *Chollas Creek Integration Project* is to gather and generate scientific data and stakeholder input to form an integrated planning process for the Pueblo Hydrologic Unit that will update the Chollas Creek Enhancement Program and establish implementation strategies. The *Chollas Creek Integration Project* seeks to develop a stakeholder-driven watershed management process, restore habitat and flood management to improve environmental health/safety, surface water quality, and availability of open space. The following section lists the projects goals and their corresponding monitoring and assessment programs:

Project Goals

Build support among public and private agencies/NGOs for watershed planning: To effectively monitor and assess the support among public and private agencies for watershed planning, informal surveys at stakeholder meetings will be distributed to determine progress.

Build awareness among community leaders about watershed planning: Community leaders and groups will also be surveyed to account for awareness level. This process will help project proponents determine if awareness improvements have been made.

Engage watershed residents and foster community stewardship: Tracking volunteer events and participation will provide performance measures that will gauge achievement of project benefits of objectives regarding the engagement of watershed residents and the fostering of community stewardship.

Reduce erosion, scour and sedimentation: Surveying of erosion sites, completed by stakeholder groups, will entail visual observations that will report existing soil conditions (i.e. slope, hydrology, geologic hazards etc.). This soil surveying program will help determine if the project has experienced erosion, scour and sedimentation reduction.

Reduce and control invasive plant species: To assess the current conditions of invasive plant species, a presentation of draft invasives report will be referenced. From there, a survey of stakeholder groups will be distributed to assess the level of invasive plant species presence. This initial assessment will allow a baseline to be set for the compilation of a Watershed Invasive Reduction/Control Plan. Future monitoring will allow monitoring staff to determine if invasive plant species are being reduced or controlled.

Reduce flooding: Monitoring for flood management improvements will include visual evaluations that will involve the identification of reduced channelization, less soil erosion/sedimentation and greater vegetative zones. These factors when observed will correlate to flood management improvements.

Reduce stormwater contamination and sedimentation: Like the reduced flooding monitoring program, this project objective will utilize the same method, visual observations. Visual assessments for this project assessment will include water color, turbidity and clarity observations. Documentation of these observations will verify the project's performance with respect to stormwater contamination and sedimentation reduction.

Pollution prevention outreach/education and monitoring/ maintenance (stewardship): Community members and volunteers will be educated in data gathering/analysis and the identification of illegal dumping/pollutant discharges. Volunteer data, violator identification and visual observations will be documented and reported. This outreach approach promotes pollution prevention activities and expands environmental stewardship. The quantification of organized outreach/cleanup activities, volunteers and submitted documents will be an indicator of project performance. Measuring progress will be achieved by comparing participation against previous years (or other applicable time periods).

Restore native habitat: Per the approved restoration and enhancement plan, success criteria shall be established to measure the success of the restoration effort. It is anticipated that success criteria for Phase 1 shall include survivorship, height and percentage of groundcover / understory / over story coverage. Meeting success criteria shall insure that native habitat is restored to Phase 1 within Section 2A of Chollas Creek.

Monitoring System

Baseline data regarding existing conditions, pre-restoration, and enhancement will be gathered and reported in the Chollas Creek 2A Biology Study Update. A restoration and enhancement plan will also be prepared and approved by the City of San Diego and regulatory agencies (California Department of Fish and Game, San Diego RWQCB, and U.S. Army Corps of Engineers). Monitoring of the creek restoration project will be conducted on both a qualitative and quantitative basis per an approved restoration and enhancement plan. Qualitative data will be collected regarding plant health and development, effectiveness of the irrigation system and the control of exotic species. Qualitative monitoring will be performed by the project biologist monthly, then bimonthly and then quarterly for a period of 3-5 years until the success criteria as stated within the restoration and enhancement plan are met. Quantitative monitoring will consist of the collection of vegetation data. Data consist of vegetation cover, height and make up and survivorship of plantings. Permanent transects will be established within the restoration/enhancement area and data shall be collected using the line intercept method. Permanent photo points will also be established. Data will be analyzed and an annual report prepared and submitted to the City and permitting agencies for 3-5 years until the success criteria are met. Data shall be collected and maintained by the project biologist.

Table 6-2: Performance Measures
Chollas Creek Integration Project

Benefits	Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Maximize Stakeholder Involvement in Watershed Planning	Build support among public and private agencies/NGOs for watershed planning.	Regular stakeholder meetings; collaborative grant writing; public awareness and education	# of meetings # of attendees Frequency of meetings #of stakeholders collaborating on grants	Increase numbers of collaborative , multi-stakeholder applications by two	Informal survey at stakeholder meetings	Integration of two watershed applications; to include 2012 SDIRWM request
Maximize community awareness and involvement	Build awareness among community leaders about watershed planning	Regular watershed planning outreach to community groups	# of groups meetings carrying planning message; # of attendees; frequency of meetings; # of residents represented by groups	Increase in awareness of watershed planning benefits at community organizations	Survey of community group agendas (pre- and post) to reflect inclusion of watershed planning	A minimum of eight organizations including watershed planning issues on their agendas at least twice in 2011-12.
Maximize community stewardship and identity	Engage watershed residents in trail uses and creek access study; foster community stewardship	Completed watershed public trail funding plan; community volunteer events	Existing conditions report of all proposed or desired trails	Completed research, field investigation, and stakeholder/ community group survey of trail sites; recommend trail construction plan, including concept design, cost estimate, and priority	Based on presentation of draft trail funding plan, survey of stakeholders group; tracking volunteer events and participation	First trail project designed and approved through stakeholders consensus in 2012.
Habitat Protection	Reduce erosion, scour and sedimentation	Completed watershed erosion control plan	Existing conditions report evaluating soils, slope, hydrology, precipitation, geologic hazards	Completed research, field investigation, and stakeholder/ community group survey of erosion sites; recommend reduction/control project design, cost estimate, and priority	Based on presentation of draft trail funding survey of stakeholders group; tracking volunteer events and participation	Erosion control implementation plan approved through stakeholders consensus in 2012.
Habitat Protection	Reduce and control invasive plant species	Completed watershed invasives reduction/ control plan	Completed existing conditions report of invasives	Completed invasive species mapping; summary of data gaps; research of historical and existing removal and control efforts	Based on presentation of draft invasives report, survey of stakeholders group	Approval of invasives control plan through stakeholder's consensus in 2012.

Benefits	Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Creek Restoration	Reduce flooding caused by channelization, soil erosion/sedimentation, and dumping of trash and construction debris into the creek through structural modifications	<ul style="list-style-type: none"> *Reduce flood damage / insurance claims; *Increase public safety; *Reduce bank erosion in project limits. 	*Reduction in number or frequency of flood damage / insurance claims.	<i>TBD</i>	Visual assessment	Reduction in flood claims.
Creek Restoration	Reduce storm water contamination and sedimentation in Chollas Creek Section 2A through replacement of non-native plants with native vegetation (biofiltering),	Reduced landscape irrigation demand at participating sites	sites where irrigation or landscape retrofits performed	<i>TBD</i>	Visual assessment	Reduction in road closures due to flooding
Creek Restoration	Pollution prevention outreach/education and monitoring/maintenance (stewardship)	<ul style="list-style-type: none"> *Outreach/Education to surrounding communities, businesses, and residents *Community Involvement in Cleanup and Maintenance *Implement LID/HMP development standards upstream 	<ul style="list-style-type: none"> *Data gathering, analysis and annual reports *Reduction in illegal dumping or pollutant discharges to waterway 	<ul style="list-style-type: none"> *Organized community cleanup activities *Reduction in dry weather flows, and slower peak flow response to small rainfall events 	<ul style="list-style-type: none"> *Visual assessment and reduction of violators identified *Observed activities 	Based on number of cleanup activities per year**
Creek Restoration	Restore native habitat as protected open space within Chollas Creek Section 2A	Successful implementation of restoration / enhancement plan	Qualitative and quantitative data gathering, analysis and annual reports	Qualitative and quantitative monitoring and data analysis of restoration site (survivorship of container plants, % vegetative cover). Increased observations of wildlife use.	Visual observations, survivorship evaluation, transects to determine % vegetative cover, maintaining high vegetative coverage of native species as specified in success criteria	Meeting success criteria for survivorship and targets for % vegetative coverage (example: 90% survivorship of container plants, 90% native vegetative cover and 1 year of no irrigation by yr 5)

Project 11: Regional Water Data Management Program

The *Regional Water Data Management Program* seeks to establish a regional stakeholder-driven Workgroup to guide development of the regional data management system recommendations, provide a snapshot of current data management efforts, and establish basic design parameter recommendations document for the future develop of a regional, web-based system for sharing data and information. Project goals outlined below and their corresponding monitoring and assessment programs will help to quantify and verify overall project performance.

Project Goals

Assess the data management needs of the IRWM stakeholders: The number of stakeholders involved and the number of meetings will be tracked through meeting agendas and sign-in sheets. The needs of each of the stakeholder groups will be determined through assessment tools such as surveys and questionnaires that are to be developed by the Data Management System Advisory Workgroup. The measurement tools described will help in assessing the data management needs of the IRWM stakeholders.

Develop a data management system basin design recommendations: All public comments received on the Data Management System Basin Design Recommendations will be documented as part of the project record. Tracking the number of public comments, facilitated meetings and stakeholders attending the meeting will ensure that the end product considers and meets, as appropriate, stakeholder needs.

Monitoring System

The number of stakeholders involved and the number of meetings will be tracked through meeting agendas and sign-in sheets. The needs of each of the stakeholder groups will be determined through assessment tools such as surveys and questionnaires that are to be developed by the Data Management System Advisory Workgroup. All public comments received on the Data Management System Basin Design Recommendations will be documented as part of the project record.

This project will consider all efforts to date for the management of data especially CEDAN, the California Environmental Data Exchange Net. The intent is to identify which datasets in the San Diego region already participate in CEDEN and which data sets do not.

Table 6-22: Performance Measures Table
Regional Water Data Management Program

Benefit Type	Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Maximize Stakeholder Involvement and Stewardship	Assess the data management needs of the IRWM stakeholders	Five Needs Assessments reflecting the needs of 5 stakeholder groups	* # stakeholders involved in needs assessment * # stakeholder group meetings	Clearly defined data management needs for each of the five stakeholder groups	* Surveys and questionnaires * Track # of Facilitated meetings * Track # of stakeholders attending meetings.	* Number of Stakeholders involved * Number of stakeholder meetings
Water Resources Data and Information	Develop Data Management System Basin Design Recommendations	Data Management System Basin Design Recommendations	* # stakeholders participating in the public comment of design recommendations * # stakeholder group meetings	Data Management System Basin Design Recommendations Document	* Track Public Comments * Track # of Facilitated meetings * Track # of stakeholders attending meetings.	* Develop Data Management System Basin Design Recommendations Document

